

GEOECOLOGICAL PROBLEMS IN JAMBAY DISTRICT AND MEASURES AIMED AT IMPROVING THE GEOECOLOGICAL SITUATION

Khayitmurodov Alijon Olimjon ugli, Sharipov Shavkat Muxamajanovich

Abstract: This article describes geoeological problems in Jambay district and measures aimed at improving the geoeological situation.

Key words: geoeological situation, geoeological problem, geosystem, natural geographical factors, natural geographical processes, natural resource, relief, climate, flow, components of nature.

Jambay district is located in the eastern part of Samarkand region, between Zarafshan river and Gobdun mountains. It is bordered by Payarik district, Jizzakh region in the north, Okdarya and Samarkand districts in the west, Bulungur district in the east, Tayloq district in the south. The length of its borders is 144 km. The total area of this district is 560 sq. km.

According to the geological and geomorphological structure, the territory of the district is quite sophisticated. A large part of the territory is located in Zarafshan basin and the terrain rises from south to north and joins the Gobdun mountains (Fig. 2). picture). Two thirds of the territory of the district is located on the terraces of the Zarafshan River. The rest of the territory corresponds to the Gobdun mountains and its foothills.

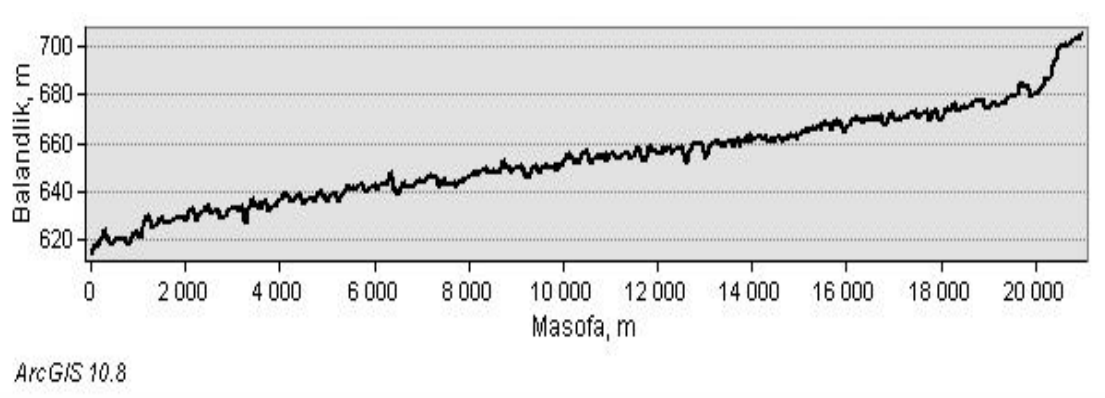


Figure 1. Topographic profile of Jambay district from west to east along 39°46'10'' north latitude

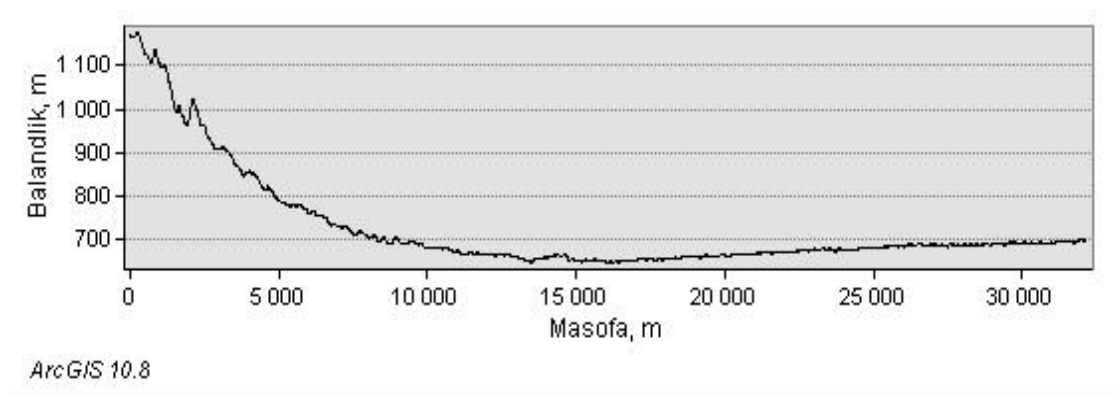


Figure 2. Topographic profile from north to south along 67°7'30'' east longitude of Jambay district

The geocological problems in Jambay district and the measures aimed at their solution were considered according to the state of the geocological situation (**highly dangerous, dangerous, moderately dangerous, allowed**).

In Jambay district, the geocological situation is highly dangerous, including the 2nd, 3rd, and 4th landscape types (Table 1). It is used in irrigated agriculture, mainly wheat, sugarcane, vegetable crops, partly cotton. Irrigation networks have become an integral part of geosystems. Landscapes are occupied by anthropogenic elements and "Earth capacity" is high.

The following geocological problems have arisen in areas with a **highly dangerous** geocological situation:

- Problems related to intensive land use (soil salinity, soil erosion);
- Problems related to intensive use of water (pollution of underground and running waters);
- Air pollution problems (medium and small industrial enterprises in Jambay city pollute the atmosphere);
- Problems related to the pollution of the natural environment by harmful chemicals (accumulation of household waste in the areas).

Problems related to intensive use of land have long been caused by unplanned and unwise use of land. 53.7% of irrigated soils in Jambay district are weakly saline, 5.5% are moderately saline, and 0.2% are strongly saline [58]. In addition, the fertility level of irrigated soils is decreasing. The main reason for this is that the amount of substances removed from the soil by cultivated plants every year is greater than the amount of substances deposited on the ground. In the soils irrigated with sewage, the humus content decreased by 40-50% in the next 70-80 years. A decrease in the amount of humus leads to a decrease in the quality of soils, resistance to water and wind erosion. Continuous cultivation of arable soils with heavy rubber-wheeled tractors causes compaction of the subsoil layer. This

destroys the water absorption and air exchange properties of the soil. Excessive use of pesticides and mineral fertilizers causes serious damage to soil microorganisms. Microorganisms play an important role in the exchange of matter and energy in the soil. Dry soils are distributed in the northern part of Jambay district. About 90% of these soils on the slopes of the Gobdun mountains have been eroded to varying degrees.

Problems related to the intensive use of water are related to the pollution of the Mirza, Bulungur canals and underground water in the territory of Jambay district. Canal waters are polluted as a result of wastewater used for irrigation, household waste from cities and towns, and various wastewaters. This has a negative impact on the health of the population living in the lower parts of the canals through the agricultural products grown. The geosystems in the central and southern parts of Zhomboy district have semi-hydromorphic and hydromorphic characteristics, and the groundwater is quite close to the surface, that is, it is 6-7 m in the central parts of the district, and 2-3 m in the southern parts. This causes the water used for irrigation to seep through the soil and join the groundwater. The seepage water carries with it pesticides used against agricultural pests, which are harmful to human health, into the underground waters, reducing the quality of their use as drinking water.

Although the problems related to atmospheric air pollution have not developed seriously, it is necessary to monitor the state of atmospheric air and not be indifferent to local problems. Medium and small construction materials enterprises built in Jambay are located in the places where the main population lives and are harming the health of the population. The growing number of vehicles also contributes to air pollution.

Problems related to the pollution of the natural environment by harmful chemicals include household waste that accumulates in landfills every year and their impact on the environment. Landfills are a source of various disease-carrying insects. Harmful substances released from landfills are spread by wind. The main landfill in Jambay district is located in landscape type 3, near the town of Dehkhanaabad (500 m), which can harm the health of the people living there to varying degrees (Fig. 3).



Figure 3. Dumping land in Jambay district (located at 39°43'56" north latitude, 67°07'16" east longitude)

The following measures aimed at solving geo-ecological problems should be implemented in areas with a **highly dangerous** geo-ecological situation:

- ✓ Use of drip irrigation technologies in the foothills in order to reduce and prevent the erosion process from the Gobdun foothills to the Zarafshan river;
- ✓ Full compliance with agrotechnical rules of crop rotation;
- ✓ Development and application of measures against water and wind erosion;
- ✓ Taking into account the densification of subsoil layers of irrigated soils, establishing deep plowing using new technologies;
- ✓ To increase the application of natural fertilizers to the soil in order to increase the soil fertility, to determine the amount of mineral fertilizers accumulated on the soil;
- ✓ To increase the collector networks in order to regulate the water used for irrigation;
- ✓ Using new technologies for cleaning polluted wastewater, cleaning and discharging water from industrial enterprises in the city of Jambay;
- ✓ To strengthen state control over ensuring the cleanliness of canal water.

Landscape type 1 is included in the regions with **dangerous** geoeological situation in Jambay district (Table 1). The banks of the Zarafshan river are occupied by river groves, irrigated agriculture is carried out in the areas near the groves, and the areas where the trees are cut are used for grazing purposes. Landscapes are occupied by anthropogenic elements and the indicators of "Earth capacity" are high.

The following geoeological problems have arisen in the regions with a **dangerous** geoeological situation:

- Problems related to the cutting of bushes and trees (cutting of trees in the groves of the Zarafshan river);

- Problems related to the use of recreational systems (infrastructures are not well established in Zarafshan National Nature Park);
- Problems related to intensive land use (soil salinity, soil erosion).

The problems related to the cutting of bushes and trees are getting more and more acute and deep. Degradation of Zarafshan river forests has been happening for a long time. For example, it can be clearly observed that the forests have decreased in the 15-year period (2004-2018) (Fig. 4).



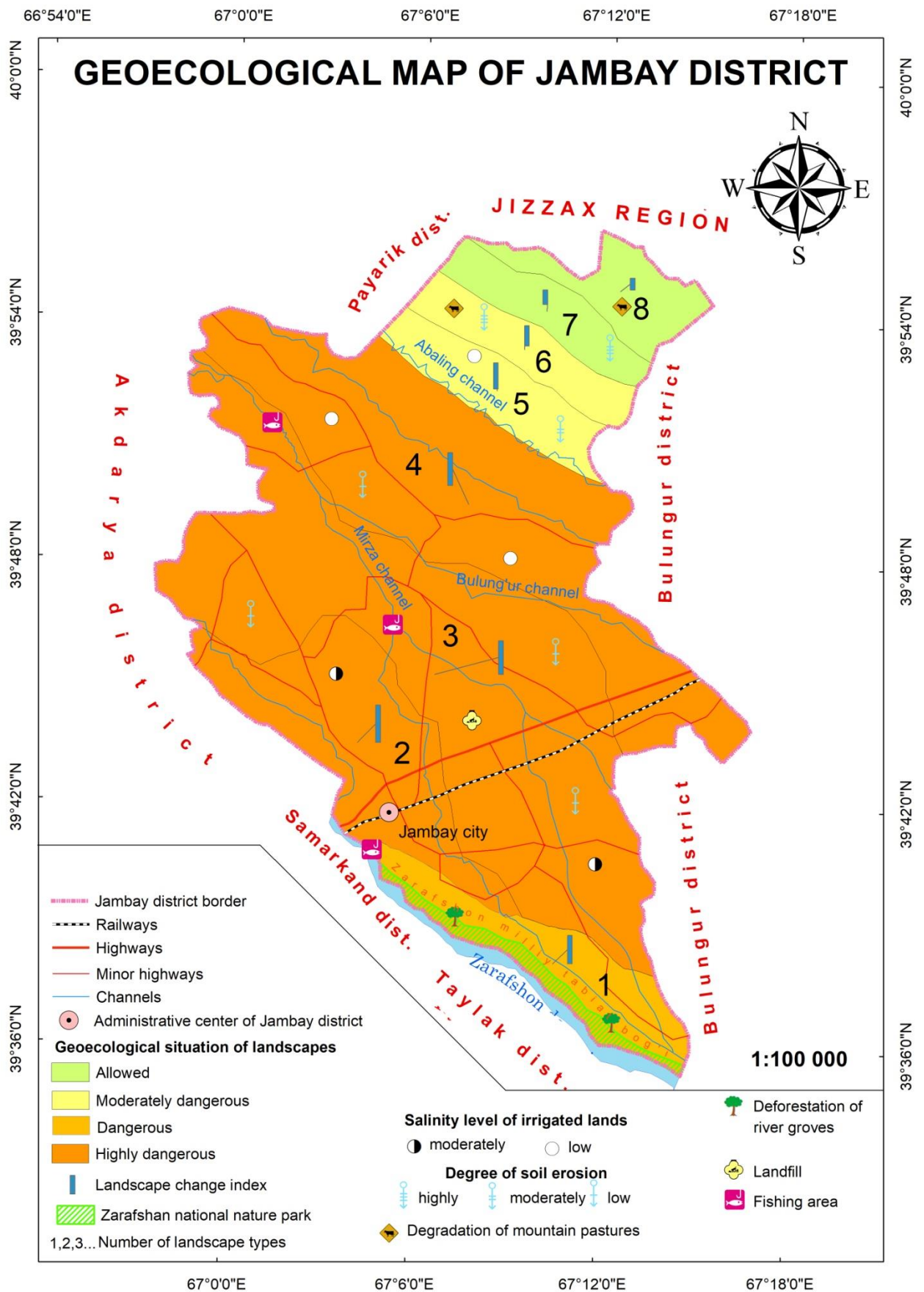
Figure 4. The area of Zarafshan river forests in 2004 and 2018 (from Google Earth.com)

The cutting of forests causes the erosion process to increase, the dust and pollen to spread more into the environment, the microclimate in this area changes, and the forest fauna is damaged.

Problems related to the use of recreational systems are related to the rational use of Zarafshan National Nature Park. According to the decision of the Cabinet of Ministers of the Republic of Uzbekistan No. 87 of February 7, 2018 "On the establishment of the activities of the Zarafshan National Nature Park", the Zarafshan National Nature Park was established instead of the Zarafshan State Reserve. The total land area of Zarafshan National Nature Park is 2426,9 hectare. Along the right bank of the Zarafshan river, it occupied 1169,9 hectare from the territory of Jambay district and 1257 hectare from the territory of Bulung'ur district. The territory of the Zarafshan National Nature Park is divided into 3 zones: the zone for economic and other purposes (occupying an area of 302 hectare), the recreation zone (352.9 hectare), and the zone converted into a reserve (1772 hectare). Zarafshan National Park does not have favorable conditions for domestic and international tourists, i.e. there is no comprehensive infrastructure. Breeding of ornamental tree species, construction of hotels for international tourists, provision of reservoirs and boulevards with the necessary equipment are the main problems in the Zarafshan National Nature Park.

Types of landscape t/r	Criteria for determining the degree of change	Geocologic al situation
1	It is used for harvesting plants in forests (cutting down trees), for grazing livestock in areas where forests have been cut, and for irrigated agriculture in areas close to forests. As a result of felling trees in the forests, soil erosion is increasing. The irrigated soils are weak and moderately salinized. The share of areas occupied by anthropogenic elements in the landscape is high - around 10%. The landscape change index is equal to 65. Population density and "Earth capacity" are equal to 204. The interaction between the components of nature has changed.	highly dangerous
2,3,4	It is used in irrigated agriculture, mainly wheat, sugarcane, vegetable crops, partly cotton. Irrigation networks have become an integral part of geosystems. The soil has been eroded by irrigation, changes are occurring in its geochemical composition. The water used in irrigated agriculture seeped through the soil and had a negative impact on the quality of underground water. A unique microclimate has been formed under the influence of irrigated agriculture. Soils are weak and moderately salinized. Runoff waters are polluted to varying degrees by irrigated agriculture and sewage from the city of Jambay. Landfills with household waste are polluting the environment on a local scale. The occupation level of landscapes with anthropogenic elements is high - more than 20%. Population density and "Land Capacity" are high - from 200 to 500. The landscape change index is in the range of 75-85. The interaction between the components of nature has undergone a strong change.	dangerous
5,6	It is used for irrigated and spring farming and pasture purposes. Wheat is mainly grown on dry lands. Soil erosion is strong. The occupation level of landscapes with anthropogenic elements is small - 0.5-2%. The landscape change index is in the range of 45-60. Population density and "Land Capacity" are low - less than 10. The interaction between the components of nature has undergone a weak change.	moderately dangerous
7,8	It is used in mountain-pasture cattle breeding, hunting, partly for recreation. Running water is not polluted. Quantitative reduction of some medicinal plants and hunted animals is observed. The occupation level of landscapes with anthropogenic elements is very small - less than 0.1%. The index of change of geotisms is less than 35. The state of anthropogenic load is low - there is no permanent population. The interaction between the components of nature has undergone a weak change.	allowed

Table 1. Indicators of assessment of the geocological situation in the landscapes of Jambay district



Soil salinity and soil erosion are among the problems related to intensive land use in the regions of Jambay district with a severe geoecological situation. Soil erosion is intensifying with the cutting of forests near the Zarafshan river.

The following measures aimed at solving geocological problems should be implemented in areas with a dangerous geocological situation:

- ✓ Strengthen control in Zarafshan National Nature Park close to settlements and increase ecological culture of the population;
- ✓ To strengthen measures aimed at preventing firewood collection (tree cutting) from the territory of the Zarafshan National Nature Park;
- ✓ Construction of modern hotels in Zarafshan National Nature Park for the purpose of tourism development, equipping reservoirs and avenues based on the experience of foreign countries, planting ornamental trees;
- ✓ studying the impact of tourism on the Zarafshan National Nature Park, conducting scientific research;
- ✓ To reduce soil erosion, organize planting of saplings instead of cut trees in forests.

In Jambay district, the regions with an **moderately dangerous** geocological situation include the 5th and 6th landscape types (Table 9). It is used for irrigated and spring farming and pasture purposes. Wheat and barley are mainly grown on dry lands. Landscape occupation with anthropogenic elements and "Earth capacity" indicators are small. The index of change of landscapes is average.

The following geocological problems have arisen in regions with an average geocological situation:

- Problems related to intensive use of land (speed of erosion in the areas of irrigated agriculture on the slopes of Gobdun mountain);
- Problems related to intensive animal husbandry;
- Problems related to the intensive use of water (flooding in Gobdun foothills).

The problems related to the intensive use of land can include the organization of irrigated agriculture in the Gobdun mountain in the direction of the slope of the slope (Fig. 5). As a result, the erosion process on the slopes increases.



Figure 5. Drip irrigated and semi-arid lands on the slopes of Gobdun mountain

Continuous use of pastures leads to problems related to intensive grazing of livestock, as a result of which certain types of plant species decrease and others (not consumed by livestock) increase, and interactions between nature components

are disturbed. The disorderly movement of vehicles in pastures causes damage to vegetation.

Problems associated with intensive water use include the occurrence of occasional floods in early spring. A flood event poses a threat to residential areas in river basins.

The following measures aimed at solving geocological problems should be implemented in areas with an **moderately dangerous** geocological situation:

- ✓ In order to prevent the acceleration of the erosion process, refrain from planting crops irrigated by irrigation (continuous) or furrows on plowed lands in the Gobdun foothills;
- ✓ To reduce soil erosion, organize irrigation horizontally along the slope, not in the direction of the slope;
- ✓ Establishment of narrow track roads in order to establish the alternating use of pastures, to prevent the damage of pasture plants due to the disorderly movement of vehicles;
- ✓ Not to build residential buildings in flood-prone river basins, to establish flood shelters.

Areas with **allowed** geocological situation in Jambay district include landscape types 7 and 8 (Table 1). It is used in mountain-pasture animal husbandry, hunting, collection of medicinal plants. There is no anthropogenic load on geosystems (there are no permanent residential buildings), the landscape change index is small.

The following geocological problems have arisen in areas with a allowed geocological situation:

- Problems related to intensive animal husbandry;
- Problems related to the decrease in the number of plants and animals (collection of medicinal plants, hunting of animals).

In the regions where the geocological situation is satisfactory, the following measures aimed at solving geocological problems should be implemented:

- ✓ Resting pastures from time to time;
- ✓ Development of guidelines for the collection and hunting of medicinal plants.

References:

1. Sharipov Sh.M., Allaberdiyev R.H., Kuchkarov N.Y., Rozimova H.K. Geocology. -Tashkent: "University". 2017. -144 p.
2. Zakirov Sh.S. Fundamentals of landscape science. -Tashkent: "Universitet" 2010. -158p.

3. Local history atlas, Samarkand region. State committee of land resources, geodesy, cartography and state cadastre of the Republic of Uzbekistan, Tashkent 2016. -58 p.
4. Jambay District "Ecology and Environmental Protection Inspection" fund materials (2019-2021).
5. Foundation materials of the "Department of Work with Neighborhood and Families" of the Jambay District Authority (2021).
6. Fund materials of the "Yergeodezkadastr" department of Jambay district (2021).